

The Role of Nutrition in Managing Autoimmune Diseases

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ABSTRACT

Autoimmune diseases are chronic conditions that arise from an overactive immune response targeting the body's tissues, leading to inflammation and organ damage. Conventional treatments primarily involve immunosuppressive drugs, which may have significant side effects. Emerging research highlights the critical role of nutrition in modulating immune function and managing autoimmune diseases. A well-balanced diet rich in essential nutrients, antioxidants, omega-3 fatty acids, and probiotics can help regulate inflammation, promote gut health, and improve disease outcomes. Personalized dietary approaches, including anti-inflammatory and elimination diets, have shown promise in alleviating symptoms and enhancing quality of life. This paper examines the link between nutrition and autoimmunity, emphasizing the importance of dietary strategies as complementary treatments for autoimmune diseases.

Keywords: Autoimmune diseases, inflammation, nutrition, diet, omega-3 fatty acids, probiotics, antioxidants.

INTRODUCTION

Autoimmune diseases arise from immune attacks on self-cells, with symptoms stemming from the immune system's loss of tolerance to self-antigens. More than 100 autoimmune diseases are classified, affecting 5% to 8% of the global population. Common conditions include lupus, rheumatoid arthritis, psoriatic arthritis, inflammatory bowel disease, multiple sclerosis, nephritis, and scleroderma. These diseases often last a lifetime, marked by symptom flare-ups and periods of remission, significantly impacting patients' quality of life due to pain, fatigue, anemia, weight loss, and increased heart disease risk. Treatment typically involves strict immunosuppressive therapy, which bears its side effects and financial burdens. Each patient's treatment journey can be lengthy and complex, often requiring immunomodulatory drugs and many blood tests. Chronic inflammation in autoimmune diseases results from a combination of genetic, environmental, and hormonal factors. Genetic susceptibility interacts with other elements that polarize immune responses towards the self, leading to organ-specific and sometimes multi-organ damage. Individuals with the same diagnosis can experience varying disease triggers due to different etiologic factors. Immune tolerance to self-antigens involves central and peripheral processes managing autoreactive T lymphocytes in the thymus and periphery. Central tolerance promotes the deletion of thymocytes recognizing self-antigens while allowing low-affinity thymocytes to develop into suppressive CD4+ cells or peripheral T cells. This tolerance mechanism is mediated by CD4-CD8 double-negative lymphocytes in the thymus, where autoimmune regulator transcription factor (AIRE) promotes thymocyte deletion by expressing tissue-specific antigens. However, some autoreactive T cells evade these mechanisms and persist in the bloodstream and tissues, aided by regulatory T lymphocytes (Tregs). Recent insights reveal the link between autoimmunity and the host's metabolic state. Systemic metabolism affects immune responses, while immune responses also influence the metabolic state of

organs and organisms. Nutrition explores the relationship between food consumption and health, highlighting dietary impacts on well-being [1, 2].

Understanding Nutrition

Nutrition is the process by which organisms acquire and use food for cellular activities, including growth and repair. It serves a bioenergetic function by providing necessary organic nutrients—carbohydrates, proteins, and lipids—for energy production via ATP synthesis. The main energy source is an organic compound capable of donating hydrogen or electrons, fueling metabolism involving various cellular functions. Nutrition can also be bioinformative, enabling certain foods to modulate gene expression without direct nutrient consumption. Certain signals in fruits and herbs can epigenetically regulate genes, influencing cellular activities to promote health. Nutrition has been shown to effectively optimize organ and cellular activities, growth, recovery, and health, sometimes even rivaling pharmacological drugs in managing conditions like diabetes and hypertension. It intersects with biochemistry, immunology, physiology, and anatomy, creating a comprehensive field for further exploration. Understanding nutrition aids in grasping homeostasis, metabolism, and cellular functions. Familiarity with macronutrients, micronutrients, diet-health relationships, nutrient metabolism, and energy cycles is essential for participation in these concepts [3, 4].

The Link Between Nutrition and Autoimmune Diseases

Understanding the interconnections between nutrition and autoimmune diseases requires interdisciplinary insights as modern medicine reveals the mechanisms driving these conditions. Research indicates that genetic predispositions in complex diseases are significantly influenced by environmental factors, underscoring the importance of nutritional components in modulating immune responses and inflammation. Consequently, dietary patterns impact the development of autoimmune conditions affecting millions. There is considerable interest in adopting healthier diets or specific food components as complementary therapies alongside conventional treatments for multifactorial diseases like multiple sclerosis (MS) or rheumatoid arthritis (RA). Additionally, the gut serves as a crucial link between the external environment and chronic inflammation, highlighting the need for a nutraceutical perspective in autoimmune diseases. Clinical observations suggest that nutritional deficiencies can exacerbate or trigger autoimmunity, showing that inadequate nutrient intake is significant in the onset and progression of autoimmune disorders. Ongoing scientific research into diet, gut health, and systemic inflammation makes the intersection of nutrition and autoimmunity a topic of increasing public interest. With the recognized links between food, gut health, and immunity, it is no surprise that specialists are focusing on chronic immunological conditions. An enhanced understanding of these mechanisms supports intelligent dietary and lifestyle approaches to manage symptoms that significantly impact many people's quality of life. Given the ongoing discussions around MS and related neurological conditions, an interdisciplinary approach involving experts is crucial to address rising concerns effectively. In summary, there is potential for adjunctive treatment methods based on nutritional knowledge, which, while not entirely replacing conventional treatments, can complement pharmaceutical immune suppression effectively [5,6].

Essential Nutrients for Immune Function

Adequate nutrition is crucial for optimal cell function, including immune system cells, which have high metabolic activity and increased energy demands during infections. If energy intake is insufficient, the immune system utilizes endogenous fuels; adequate intake comes from dietary sources. The immune system comprises diverse cells like macrophages, neutrophils, and T- and B-cell lymphocytes, all requiring critical dietary components to respond effectively to infections and manage inflammation. Proper nutrition can enhance immune cell function, while undernourishment impairs immunity regardless of the cause. Key nutrients include protein, energy, vitamins A, E, B6, B12, C, D, and folic acid, which support various immune functions, from skin barrier integrity to lymphocyte activity and phagocytosis. Sub-optimal vitamin status jeopardizes immune defenses. Despite some claims to the contrary, vitamins play a vital role in immune modulation, especially in autoimmune diseases. Additionally, minerals are essential; major minerals (Na, K, Ca, Mg) are needed in larger quantities, while trace minerals (Cr, Cu, I, Fe, etc.) are vital in smaller amounts. Studies confirm mineral importance in maintaining immune health, with deficiencies linked to compromised defenses. At-risk populations include the elderly, chronic patients, and those with inadequate diets. Proper intake of Ca, Cr, Mg, Se, and Zn is associated with improved immunity, while low intake of Cu, Fe, and Ni is linked to higher disease risk. Knowledge of nutrients can enhance immune fitness and reduce autoimmune disease risk. A balanced diet is the best

strategy for enhancing immunity and preventing autoimmune conditions. While individual nutrient supplementation can influence immune response, its effects vary, suggesting that benefits may stem from addressing nutrient gaps. Thus, public health advice encourages a balanced diet while advising caution on supplements, emphasizing professional guidance [7, 8].

Anti-Inflammatory Diets

Anti-inflammatory diets offer customized dietary patterns to reduce inflammation and manage autoimmune disorders, gaining recognition over the past decade. They link diet and lifestyle choices with the onset and alleviation of autoimmune symptoms. Nutritional treatment, focusing on food selection and the optimal balance of macro- and micronutrients, is crucial for managing these disorders and their comorbidities. Various anti-inflammatory regimens exist, with the Mediterranean diet being one of the most recognized. Specialized diets have also been designed for rheumatoid arthritis (RA) and related risk factors. These dietary patterns, informed by research on food groups and chronic inflammation, support healing and inflammation management. Prominent examples include plant-based diets and the Mediterranean approach. Key principles, advantages, challenges, and recommended biomarker testing for these diets are discussed. Unlike typical dieting, these eating habits offer a sustainable variety, likely enhancing overall health and quality of life for individuals with inflammatory autoimmune disorders. While the diets suggest what to eat or avoid, they are not uniform solutions; individual dietary needs vary. Personalized approaches, including biomarker testing, may enhance effectiveness. This empowers individuals with knowledge for conscious food choices fostering bodily healing. Healthcare professionals acknowledge that anti-inflammatory diets can alleviate the severe impacts of autoimmune diseases, emphasizing the diet's role in managing inflammation-related discomfort [9, 10].

Role of Omega-3 Fatty Acids

Autoimmune conditions involve a dysregulated immune system leading to chronic inflammation and tissue damage. Essential fatty acids, especially omega-3s, are recognized for their anti-inflammatory benefits on immune health. Omega-3 fatty acids, a type of polyunsaturated fatty acid (PUFA), include eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), predominantly found in fish. Alpha-linolenic acid (ALA), another type of omega-3, can be converted into EPA and DHA in the body and is found in flaxseeds, chia seeds, and walnuts. In autoimmune diseases, the initially beneficial inflammatory responses become prolonged and chronic, resulting in inflammation accumulating in healthy tissues due to the continual generation of immune cells. Omega-3 fatty acids help modulate inflammation, promoting the production of anti-inflammatory molecules. Research indicates that omega-3 supplementation can improve disease activity and patient outcomes in autoimmune diseases like inflammatory bowel disease, lupus, and rheumatoid arthritis. In the body, supplementation increases EPA and DHA levels while decreasing pro-inflammatory omega-6 fatty acids, thereby shifting immune cell status. Omega-6s compete with omega-3s for conversion to EPA and DHA, and their high levels in Western diets can lead to increased pro-inflammatory substances. Therefore, balancing omega-3 and omega-6 intake is essential. A proper balance is crucial as arachidonic acid (AA), the main omega-6 fatty acid, can convert into potent pro-inflammatory molecules in cells [11, 12].

Importance of Antioxidants

Oxidative stress is defined as an imbalance between oxidants and antioxidants in the body, leading to an excess of free radicals and the subsequent damage of cellular components. Oxidative stress is associated with an exacerbated immune response and inflammation and has been recognized as a promoter of several chronic illnesses, including autoimmune diseases. There are many antioxidants naturally present in foods, particularly in fruits and vegetables—as well as nuts, grains, and some seeds. Antioxidants play an essential role in the body's defense against harmful species, fighting against oxidative stress and protecting from the progression of inflammation and chronic conditions. An important group of antioxidants includes the vitamins C and E, as well as selenium. Citrus fruits, cherries, and peppers, along with sunflower oil and wheat germ, are rich sources of vitamin E. Vitamin C is found in berries, oranges, kiwis, papayas, and pineapples, but is also provided by various vegetables, such as green leafy ones, Brussels sprouts, cauliflower, and peppers. Moreover, bioactive sulfur components are present in garlic and onions and have proven effective in reducing proinflammatory responses. Finally, many phytochemicals present in fruits and vegetables, such as carotenoids and flavonoids, have antioxidant properties—like lycopene in tomatoes and peppers and quercetin and polyphenols contained in dark berries, red grapes, and plums. A diet with both a low intake of prooxidant resources and high consumption of antioxidant-rich foods can promote an enhanced overall health status and an easier and

quicker management of autoimmune illnesses. In particular, various investigations highlight the efficiency of antioxidants in reducing the generation of reactive oxygen and nitrogen species, as well as in inhibiting the progression of proinflammatory events. Thus, antioxidants have been proposed as a supportive strategy to enhance both inadequate and exaggerated immune processes; they may also stimulate a beneficial effect against IDO-related conditions. Given these characteristics, the potential use of dietary antioxidants, alone or in combination, became conceivable in the prevention and/or management of different chronic diseases, as well as to preserve a better health condition [13, 14].

Probiotics and Gut Health

There is a complex but critical interplay between diet, the gut, and the immune system. Basic scientific questions include: Does a diet with a higher glycemic index contribute to systemic inflammation and autoimmunity because elevated glucose levels improve microbial growth en masse, leading to dysbiosis and, hence, to increased intestinal permeability and disseminated gut microbial antigens? Conversely, do low-fat or high fiber diets reduce obesity, gut microbial immune-reactivity, and hence diminish autoimmunity? Can probiotic therapy reduce intestinal permeability, decrease circulating inflammatory cytokines and gut bacterial antigen cross-reactivity, and hence ameliorate ongoing autoimmunity? Gut dysbiosis and increased gut mucosal immune reactivity have been described in several autoimmune diseases. Disruption of a healthy symbiosis can result in bacterial overgrowth and increased gut mucosal antigen challenge, which, in susceptible individuals, may precipitate symptomatic autoimmunity. Therapeutic ingestion of probiotic or similar agents can promote healthier gut immune reactivity and the ability to discriminate healthy commensals from pathobionts. This can plausibly reduce ongoing autoimmunity or even impede its onset in those at risk. In normal conditions, pro-inflammatory pathobionts are kept in check by regulatory T cells and other mechanisms; supplementing an anti-inflammatory probiotic treatment might tip the balance in favor of the regulation of gut mucosal immune reactivity. This fermentation of indigestible substrates or synthesis of agents inhibits or kills pathobionts while simultaneously boosting healthier commensals. A focus on intestinal health is therefore likely to be a fruitful preventative avenue to reduce systemic inflammation as a precursor to autoimmunity. Health-promoting gut flora and a prudent exogenous supply of anti-inflammatory substances such as probiotics may offer the only ways to re-establish equilibrium in a non-disruptive and sustainable manner [15, 16].

Food Sensitivities and Autoimmunity

Food sensitivities are a growing concern, defined as delayed detrimental reactions to foods or their components, often influencing inflammation in autoimmune conditions. Popular diets, like the autoimmune paleo diet, reflect this awareness. Common sensitivities, particularly to gluten and dairy, are analyzed for symptom reduction through diet elimination. Individual responses to food vary based on cooking methods and medications, making it vital for people to seek diet advice from professionals rather than relying on personal experiences. Healthcare providers can support patients by using food diaries, elimination diets, and laboratory tests to assess sensitivities. Clients will receive an elimination diet plan on the fourth day to avoid suspected foods, with reintroduction after 21 days for observation of reactions. Blood tests can confirm food responses, evaluating sensitivities and intolerances by analyzing reactions to a range of foods. Food intolerances may stem from issues in digestion or absorption, often due to enzyme deficiencies or the presence of contaminants or additives [17,18].

Nutritional Supplements

Nutritional supplements can boost the immune system, decrease inflammation, and complement dietary strategies to manage autoimmune diseases better. This includes additional vitamins, such as vitamin D; minerals, such as selenium and zinc; anti-inflammatory omega-3 fatty acids; and probiotics, which provide good bacteria and support the health of the gut microbiome. Patients with autoimmune diseases might have nutritional deficiencies due to diseases or drugs; therefore, a supplement might be necessary. For example, prednisone causes bone resorption by inhibiting calcium absorption in the intestines and into the bone, leading to osteoporosis. Therefore, calcium and vitamin D supplements are generally prescribed with prednisone to prevent that. Several supplements can reduce pain and decrease autoimmune disease severity. Others might counteract with a medication or worsen a disease. Therefore, collaboration with a healthcare provider is needed. Patients should consult with their healthcare providers to figure out which supplements to take, the proper dosage, the form, and potentially to reveal further substances that might cause an interaction. An evidence-based review of the use, effectiveness, and potential concerns with such supplements is provided below. It is crucial to choose supplements of the highest quality and to buy them in a reputable shop since the quality of supplements can be highly variable, and some might contain less

than the claimed dose or even be adulterated with toxic substances. Many supplements are taken in excessive amounts, leading to overdosage, toxicity, and increased autoimmune disease progression. In conclusion, a supplement can help to manage autoimmune diseases. It can boost dietary regimens in reducing inflammation, preventing related comorbidities, and managing symptoms by supporting the immune system or neutralizing its unauthorized attack [19, 20].

The Role of Hydration

Hydration is a vital aspect of health and well-being. Water is the most abundant substance in the body and is essential to normal homeostasis. The human body is composed of around 60% water and depends on it for survival. It plays an array of roles that include the transportation of nutrients, elimination of waste products, temperature regulation, joint lubrication, digestion, and maintenance of adequate blood volume. The need for water, as a component of fluids, is intensified in people with autoimmune diseases. This is because of the immunopathological modifications as a result of the disease or the increased risk to develop comorbidities, as it is the case for digestive or renal complications that many of these diseases present. Dehydration is one of the most damaging and yet often overlooked health concerns. It is directly linked to poor health outcomes, amplifying symptoms of any pre-existing imbalance, including those typical of an autoimmune disease. Muscles contract and cramp, skin loses hydration and resilience, and circulation diminishes, leading to headaches and multiple organ failures. The heart rate increases and so does the body temperature. Verbal memory, logic, visuomotor coordination, and attention diminish, and anxiety and irritation increase. Finally, the organisms show difficulties in integrating other information and manifest exhaustion, anhedonia, and a generalized sensation of distress. It is recommended to engage in a daily intake of fluids that benefit health, such as water, herbal teas, or some types of tisanes and soups, and to eat foods with high water content, hydrating fruits and vegetables. Although food also has an important water content that could serve to satisfy at least a portion of these needs, different molecules are needed for foods to be transported into the bloodstream. This is except for water-soluble nutrients and a few volatile chemicals. Most of these molecules need to be mixed with water in the digestive tract to be soluble and to be absorbed into the bloodstream. That is why beverages constitute the most suitable form of taking in water, acting as a vehicle for all these nutritional substances [21, 22].

Meal Planning for Autoimmune Conditions

Autoimmune diseases can be challenging to manage, but proactively creating well-rounded meal plans is a key strategy to take control of food choices. This can help align with anti-inflammatory eating while avoiding individual sensitivities. Here are some tips to guide the process of planning well-balanced meals - and the snacks people need every day - to promote feeling great, maintaining energy, and having a strong relationship with food. Varied meal choices are important for having a diet that is nutritious, satisfying, and does not become monotonous. Eating a combination of protein, fat, and fiber with every meal can promote a feeling of satisfaction and energy. Take advantage of the season's nutrients by eating different fruits and vegetables. Buy foods in a variety of colors to ensure a range of nutrients. Deficiency symptoms of vitamins are not always obvious. Complex trace element deficiencies typically occur rapidly following decreased intake and are often asymptomatic. Still, they cause detrimental declines in health. The antioxidant industry is highly profitable. These agents are also found in a range of foods and can have chemical roles different from their antioxidant capacity, such as maintenance of oxidative metabolism of food. Anti-inflammatory diets are trendy, yet there are no requirements for the quantity of anti-inflammatory foods consumed. Remarkably, few studies have investigated the omega-3 objectively. However, she is presumably referring to ALA rather than EPA or DHA. Looking for more support or need a plan to get started? It can be useful to have tools in place to make the shift to eating more nutrient-rich, anti-inflammatory meals. Try meal prep techniques to set aside time for planning and cooking for the week ahead. Keep a grocery shopping list on a phone or around the house to make shopping trips quick and efficient. Inspiration can be found in one of many resources for anti-inflammatory recipes. Finally, remember that it's OK to have trigger foods or treats in moderation - make a choice and savor it. Mindful eating can promote a healthier, more enjoyable relationship with nutrition. Pay attention to hunger and fullness cues to determine how much and when to eat. Eating slowly can help you enjoy and taste meals more fully. Keep a food journal or diary to reflect on how various food choices make the body feel - emotionally and physically. Still, it is all too easy to let food plans get dictated by children's tastes or the food choices made by a parent or sibling. Flexibility is key when there are unexpected changes to meal routines or dining in family or social situations [23, 24].

Case Studies: Nutrition Intervention

Michelle, age 59, diagnosed with Hashimoto's thyroiditis and Sjögren's syndrome: Michelle is a lot to handle. She's been a little frustrated. She wants to help herself, but she can't move forward without knowing what the future holds. Why put in all the effort when things are likely to go wrong? Michelle can't imagine the pain, fatigue, and brain fog improving. The eyes are always dry and painful, with an oily layer of tears forever needed. The neck is less recognisable after a 5-year transformation, and Michelle can't stand the constant hair shedding and barely visible eyebrows. The interest in nutrition began before the autoimmune anxiety arrived. And so, the interest in food rose, as did the thyroid-stimulating antibodies, TSH, and stress levels. It made sense to stay consistent with everything else. The GP was pleased with the diligent care; the bloods would always be perfect. But the body was not. It didn't quite meet the memo for long, demanding work hours. So hard to lose weight with thyroid drugs, especially when so many foods are off the table. Will it ever be possible to lose the 15.5kg, or will more litter the bathroom scale? Will sleepless nights be eternal? Will the despair over hard work without reward persist? In time, Michelle decided perfect blood wasn't everything. She made a plan to take matters into her own hands. It is committed to heart health, reducing stress, and stretching the body. But the bulk of the work was directed towards nutrition... Too much contradiction, confusion, and restriction. The Un-Diet was born of fear and failure to understand. A program designed by someone who had no idea but tried to make everything better. While Michelle stumbled through her nutritional minefield, there was a never-ending thirst to take something helpful out of these years. And so, Michelle tried. Experimentation lasted several months, on and off, haphazard as the pseudoshakes that fed the hope. It was a list of No's, 35 items long, and it was impossible to meet them all while considering everything else that was avoided. The actions that were taken increased the hope that the future held a chance better than it was. But the conditions were severe enough to demand perfection. And perfection was impossible. So, the plan was set aside, despondency seized control, and the trajectory stalled, if not slightly reversed. Instead of meaningful experiments and incremental change, plans were made for monumental shifts in consumption from one day to the next. Each time the anticipated failure occurred, hope dwindled a little further, ushering in a brand-new era of despair—a miserable cycle of feast and famine. Fearful of the repercussions, willing to try anything, unable to keep with any for long. Nothing but self-imposed stress, guilt, and frustration, unbeknownst to all outside the tumult. And so, until one day, after six months, the flame that was everything had extinguished. Not a single action was taken about food since that time. And so very much is what is inadequate, lacking confidence, every day forever. So now, with the glimmers of potential resolution of remaining questions and impacts, with education in ways not previously understood, with an adjusted mentality and avoidance of past detriments.... It is perhaps time to restart, to commit to action once more [25, 26, 27].

Psychological Aspects of Nutrition

The psychological aspects of nutrition explore the ways that food choices and dietary habits can impact mental health and overall well-being. These connections between diet, mood, and cognitive function are a growing area of scientific research. This includes exploring how a diet may affect emotional and psychological states through the gut-brain axis. People dealing with chronic conditions, such as autoimmune diseases, may experience a variety of challenges that present psychological barriers to effective dietary management. Stress and anxiety can lead to poor eating decisions, while depression can reduce appetite and the motivation to take care of oneself. Given these potential roadblocks, it is important to consider the psychological components of nutrition when forming positive lifestyle habits. Furthermore, the relationship between diet and mental health is researched, supporting the understanding that a well-balanced, nutrient-rich diet can lead to better mood and cognitive performance. This paper aims to encourage a healthier, more mindful approach towards eating. Developing a positive relationship with sustenance is perhaps even more important when managing difficult health circumstances. These strategies may seem small, but the attention of the mind is most often drawn towards the trivial. Observe, then, what is trivial, and if you neglect that within your control, which is orderly, harmonious, and methodical, be ready to answer to the inevitable demands that result. It is all too easy to take for granted the importance of structure, routine, and planning in upholding one's health. This is especially true for individuals with autoimmune diseases, who must carefully manage stress and energy expenditure so as not to worsen their condition. Aimlessness, or a lack of projects and aims towards which to work, can lead to unproductive, chaotic behavior and the exacerbation of mental health symptoms. To encourage the achievement of health and life goals, it is of the utmost importance to

maintain a level of discipline within control. Routines should be set in place that ensure a minimum level of care and attention is given to each area of importance, such as mental health, physical health, academic or professional pursuits, and meaningful activities that spark joy [28, 29, 30].

Cultural Considerations in Dietary Choices

Cultural considerations play an important role in making dietary selections, in particular for individuals with an autoimmune disease (AID). Cultural beliefs and practices shape what is eaten and how it is eaten. It is recommended to respect a person's cultural food lifestyle while suggesting versatile dietary alterations that are required for their health. Culture can impact the availability and access to foods believed to reduce chronic disease. This can create exceptions for what is allowed to be eaten when suggested for a chronic disease. To make an AID meal plan that can be followed, foods must be chosen that support the health requirements given while reflecting some cultural norms. This will support the change advised and make meal planning more bearable. The idea of healthful AID Foods of Cultural Importance (AIDFoCI) is given to start the discussion. Cultural foods are more accessible fresh, and therefore, purchasing and cooking them in bulk provides opportunities for a variety of meals. This also means it is easy to cook large amounts of these foods in bulk, which can be stored and reheated, aiding in the practical incorporation of cultural foods. Culturally sensitive techniques to engage with individuals are outlined. This can be used to help try and understand why ideas about possible food restrictions are in place and the best way to promote change while respecting cultural beliefs and practices. A case study that shows how individual bio- and socio-demographics can be used to change intervention techniques ipso facto of food and culture is provided. Meal Acceptability Scores are a good method to identify potential problems of adoption to a new provision, and when making diet adaptations, this must be taken into consideration. Food insecurity and access problems have been lately intensified due to the results of the COVID-19 pandemic. There is a basic change in the church's teachings on what is allowed and prohibited for consumption. Compliance to a healthier diet regarding those in the "East" ethnic class is dramatically decreased when compared to other ethnic groups. Conceptions of what is "healthy" differ among various auto-immune disorders. Some exceptional food allowances are dependent on the church calendar. Despite oral prohibitions, the insight stages of adoption of a food or meal plan often require the preparation of such food. This preparation and presentation time permits the opportunity to question and dispute any oral traditions regarding what is 'healthy' to eat [31, 32, 33].

CONCLUSION

Nutrition plays an important role in managing autoimmune diseases by influencing immune responses, reducing chronic inflammation, and improving overall health. A well-structured diet, tailored to an individual's needs, can serve as an adjunct to conventional therapies, alleviating symptoms and enhancing quality of life. Key dietary elements such as omega-3 fatty acids, antioxidants, probiotics, and hydration contribute to immune regulation, while personalized meal planning helps avoid triggers and supports long-term health. While nutrition cannot completely replace medical treatment, it provides a promising avenue for holistic disease management. Further research and interdisciplinary collaboration are necessary to optimize dietary recommendations and integrate them into autoimmune disease treatment strategies.

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